

Making the Turn in Chemical Safety

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November 5, 2003





Chemical Safety Challenge

- Globally, nationally and industry-wide we have a safety problem with reactive chemicals
 - Chemical Safety Board Hazard Investigation concluded that only 10% of most serious accidents involved hazard ratings of 3's and 4's
 - OSHA attempted to gain consensus approach
- Enormous numbers of possible interactions, myriad of facilities and regulations, no agreement among the experts
- The activity level is where effective improvements and accurate information reside



<u>Common phenomena</u>

- Inaccurate and/or untimely hazardous material inventories
- High incidence of label decay
- Mystery containers
- Inventories in excess of need
- Empty cylinders (incurring monthly fees?)
- Peroxide formers, water reactives, and incompatibles
- Multiple organizations ordering the same material creating inventory excesses
- Under-appreciation for the power housed in materials



- Act now to understand the activity level processes used to manage (and mis-manage) chemicals through the life-cycle
- Diagram of Hazardous Material Life-Cycle
 - Involve the employees executing the activities
 - Examine life cycle stages of Planning, Procurement, Receipt,
 Initial storage, On site Transport, Storage, Use and Disposal
 - For each stage, characterize
 - Normal Flow Path
 - Alternate Flow Paths
 - Controls
 - Previously Identified Issues

Y-12 CHEMICAL MANAGEMENT PROCESS – EXISTING (4/8/02)

	PLANNING	PROCUREMENT	RECEIPT	INITIAL STORAGE	ON-SITE TRANSPORTATION	STORAGE	USE	DISPOSAL
Normal Flow Path	User ID AVID Order	AVID Purchase of Stock Items	Material delivery to stores Material delivery to facility of bulk quantity	Storage at stores Facilities Prolonged interim stores storage if not ready	Stores delivery to user	Storage in defined material control areas Movement to other control areas (Maintenance and Construction)	Facility Use	Request for disposal characterization To BJC
Alternate Flow Path(s)	Initiate purchase requisition Credit card order (emergency)	Purchase req. made for non-stock item from AVID vendor Purchase req. made for non-stock item from non-AVID vendor Credit card order placed (emergency)			Storage at facility if bulk quantity Swap Shop		Storage in process equipment	
Controls	Ops Mgr. planning should anticipate impact of facility MAQ IH pre-review of Stores and Avid stock items	 IH review non-stock items IH obtains MSDS Business Systems audit of credit card purchase HMIS review of subcontractor chemical use Manual IH review for credit card orders 	• Addition to HMIS inventory assigned to control area			• Quarterly HMIS inventory of control area	• Online MSDS System	• 2109 request for disposal
Previously Identified Issues	 Some custodian's control area being used by others to bring chemicals into Y-12. Transfers to? Planning not occurring Justifiable Q Pre-locating storage Seeking excess Tenants in facilities not coordinating with Ops Mgr. Potential that MAQ could be exceeded. 	No way for IH to stop purchase if problem identified Subcontractors bringing in chemicals as part of their task but not telling anyone	Some custodians not updating inventory Union issues associated with direct delivery Timeliness of delivery (storage/holding times) Emergency Preparedness concerns for unfinished receipts (e.g., deliveries not yet unpacked)		DOT regulations apply for delivery to Union Valley lab and/or other "off-site" facilities Longer delivery times due to security and plant construction (stores manpower issue)	Some custodians not completing required quarterly inventory Labeling problems with chemicals, especially infrequently used chemicals Non-BWXT contractors in BWXT facilities, but don't use BWXT HMIS	Some custodians not updating inventory (container use)	Large numbers of legacy chemicals w/ no \$\$ Management of rented, empty chemical containers (e.g., cylinders)

Y-12 CHEMICAL MANAGEMENT PROCESS – FULLY CENTRLIZED PROCESS

7/12/02 REV. 1

	PLANNING	PROCUREMENT/ ACQUISITION	RECEIPT	INITIAL STORAGE	ON-SITE TRANSPORTATION	STORAGE	USE	DISPOSAL
Normal Flow Path	User ID Management Planning	Central Chemical Management Services			Stores delivery to facility Facility Material Control Areas Facility Use			Excess Chemicals and Empty Container Management Disposal To BJC
Advantages Over Existing	More front end planning since consolidated responsibilities (e.g. MAQ comparisons, MSDS review, identification of new Y-12 chemicals, etc. Better evaluation of less hazardous materials substitution	chemicals since single group		Better inventory control since single group stores chemical inventory	Fewer chemical control areas through consolidation of areas Offers opportunity for better control of chemicals and disposal through consolidated effort			• More emphasis on recycling/reuse of chemicals
Dis- advantages Over Existing	Less user control due to presence of "middleman"	Vendors more involved in Y-12's MAQs required for business The involved in Y-12's involved in Y-12		MAQs required for	Consolidation of control areas could increase chemical hazard due to larger chemical quantities per area and storage of noncompatibles			
Concerns	Delay in receipt of chemicals by user due to "middleman" Inability of user to get required quantity of needed chemicals	Ability of users to get required quality/pedigree of chemicals they need. Chemical re-allocations cannot impact quality requirements		• Where to locate central storage areas. On site vs. off site	facilities when chemical management services operates to be successful		Must be easier for users to be successful Union (craft) concerns	How to protect quality needs of users due to use of recycled chemicals Managing the transfer of chemicals from rad/non-rad areas

= Function managed by new Central Chemical Management Services Organization

YGG-02-0209R1

Note: • Overall, use of a centralized process should offer the advantage of using better qualified/trained people for chemical management than current Y-12 system.

• Overall, increased cost over the current system is an identified disadvantage



Key Approach #1 (continued)

- Change the process to fill requirement gaps
- Compare to the CCPS Essential Practices
- Confirm there is a manager responsible for the sites chemical safety program
- Make demonstrable chemical safety improvement the reason somebody has to get up in the morning.
- Place expert eyes and feet on the shop floor



- Set expectations at the activity level
 - Timely and accurate inventories of hazardous materials.
- Clarify chemical safety expectations to your subcontractors in writing and with face-to-face discussions with work crews.
- Make Inherent Safety one of those expectations
 - Don't accumulate / horde
 - Timely response to purchase orders
 - Automated replenishment for routinely used materials



- Create a mutually supportive objective
 - Good DOE support translates to good management support
 - Performance metrics
 - Responsiveness to identified issues
 - Recurrence prevention



- Effective training to field personnel in recognition of hazards
 - Training trifecta
 - Your site process for buying, disposal identifying, analyzing and controlling
 - Reactive Chemical Recognition
 - Managing Insidious Chemical Hazards and Vulnerabilities
 - With the lab portion of the course
 - Set a target audience
 - Be prepared to respond to training results.



- Create tools to provide information at the activity level
 - AJHA linked to inventories, MSDS and CCPS Reactive computer based tools
 - Consolidated MSDS
 - Performance metrics on the web-site
 - http://tis.eh.doe.gov/web/chem_safety/tools.html



- Deal with special situations as small projects
 - Mystery containers
 - Unknown lecture bottles
 - Protection of anhydrous ammonia
 - Excess materials elimination or substitution



- Plan and execute follow up activities
 - Performance metrics recommend an annual assessment.
 - Chemical safety eyes must be on the factory floor at least quarterly
 - Subcontractors and construction should be monitored more often initially
 - Confirm suppliers are not substituting periodically



Situation Today

- 99% + on time reporting for over a year
- Accuracy approaching same level
- Very low incidence of label decay
- Excess refrigerant sold with over \$600,000 benefit to NNSA
- Peroxide formers discovered and removed
- Empty cylinders returned, sold or scrapped.
- Reviews for substitution of less hazardous materials
 - Substitute nothing is the first approach
- Identified and disposed of scores of mystery containers



What's next?

- Automated management of lifecycle using Electronic Product Code technology
- Availability of existing inventories elsewhere in the plant.
- Automated replenishments
- Chemical Supermarket?



Electronic Product Code technology

- Moving from "bleeding" to "leading" edge technology
- Unique 96 bit code placed on Smart Tag
- Portable or fixed readers detect code
- Reader controller / Host PC / software interprets code
- Need an EPCglobal identifier for DOE
- http://www.autoidcenter.org/
- Auto-compatibility?